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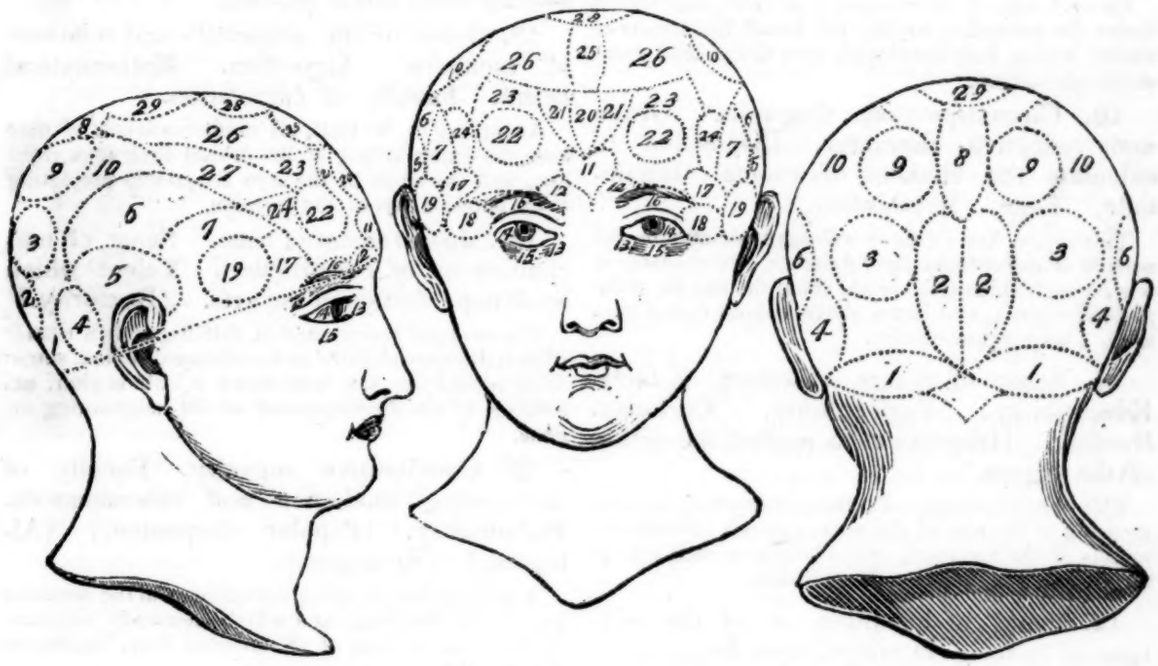
"Those who aim vigorously at perfection will come nearer to it than those whose business or despondency makes them give up its pursuit from the feeling of its being unattainable."—CHESTERFIELD.

PHRENOLOGY.



1. Organ of reproduction. Instinct of generation or of propagation. Venereal propensity. Physical love. Generative energy.

The cerebellum is the seat of this organ, which, fully developed, forms two prominences, one on each side of the head, behind and immediately above the neck. Then the back of the neck is large, the neck rounded, and the ears far apart.

2. Love of progeniture. Organ of maternity. Philogenesia. Maternal love. Love of children. Philoprogenitiveness.

This organ appears immediately above the preceding, on each side of the median line. When it is much developed, there results a projection on the posterior part of the head.

3. Organ of attachment and of friendship. Sympathy. Disposition to contract certain species of mania. (Nostalgia.)

The seat of this organ is found on a level with, and on the outside of, that of maternity. Like it, and that of propagation, it is double, and forms a protuberance on each side of the head.

4. Instinct of self-defence and of the defence of property. Organ of courage, disposition to quarrel and fight. Combativeness.

According to M. Gall, all quarrelsome persons have the head, immediately behind, and on a level with, the ears, much more prominent than poltroons.

5. Carnivorous instinct. Cruelty. Barbarity, sanguinary disposition, propensity to murder. Instinct of destruction. (Insensibility.)

In the tempero-parietal region, immediately above and behind the auditory canal, is found the prominence of this organ.

6. Organ of cunning, of finesse, of management. Instinct to conceal. Spirit of intrigue. Dissimulation. Lying. Duplicity. (Astuteness.)

The organ of cunning is a little above and before that of destructiveness. It is of an elongated form, and renders the head large above the temples.

7. Instinct of making provisions. Sentiment of property. Covetousness, propensity to steal. Theft. Usury. (Idea of *mine* and *thine*.)

This organ extends from that of cunning to within

a short distance of the external border of the supra-orbital or superciliary arch.

8. Organ of pride—propensity to elevate one's self. Propensity to inhabit certain places. Love of authority. Haughtiness. Domination.

The seat of this instinct is found on the median line, or in the middle of the head, a little beneath and behind the summit of the head.

9. Love of approbation, of glory, and of distinction. Ambition. Vanity. Point of honor. Coquetry. Ostentation. Emulation. Jealousy.

On each side of the elongated protuberance which forms the preceding organ, are found the organs of vanity, which, fully developed, give to the head great amplitude behind.

10. Circumspection, foresight. Grave and reflective character. Disposition to calculate the chances of events. Inquietude. Fear. Irresolution.

This organ, like all those which are situated on the outside of the median line, presents two elevations, one on each side of the head, about the middle of the parietal regions, and forms above, behind that of cunning, a large protuberance.

11. Sense of things. Memory of facts. Educatibility. Perfectibility. Curiosity. Docility. (Disposition to perfect the action of the organs.)

This organ is formed of a prominence, which, commencing at the root of the nose, extends towards the middle of the forehead, and enlarges on each side of the median line, between the eyebrows.

12. Sense of localities, or of the relations of space. Desire of travelling. Cosmopolism. Memory of places. (Arrangement of things.)

The seat of this disposition is situated a little above the superciliary arches or eyebrows, more or less approaching the median line, or occupying the side of the forehead.

13. Memory of persons. Faculty of recognizing readily and of retaining remembrance. (Sense of forms. Configuration.)

Eyes, of whatever form, having the internal angle a little depressed, are the external sign which announces this faculty.

14. Sense of words. Verbal memory. Wonderful facility of retaining names and signs. Propensity to talk. Loquacity. (Talkativeness. Verbosity.)

Large and prominent eyes, having the external commissure thrown a little backwards, are the index of the present faculty.

15. Sense of language. Talent of philology. Aptitude to comprehend languages. Faculty of acquiring many languages. (Polyglotism.)

When the eyes are at the same time large, even with the head, and depressed below, they are the sign of a particular aptitude for the study of languages.

16. Sense of the harmony of colors. Talent for painting. Coloring, or sense of colors. Aptitude to seize their shades.

The organ of this talent is placed in the part of the forehead which is above, and exactly corresponds to the middle of the eye. Then the external part of the eyebrow is generally very prominent.

17. Sense of the relations of sounds and tones. Talent of music. Melody. Harmony. Aptitude to comprehend the accordance of musical sounds.

This organ is situated immediately above the external angle of the eye, and when it is much developed produces to a certain degree a square and swelling lateral part of the head.

18. Sense of the properties and relations of numbers. Algorithm. Mathematical talent. Faculty of calculation.

According to M. Gall, all mathematicians of note have the external half of the orbital arch in a right line, and the angle of the eye frequently projecting at the anterior part of the temples.

19. Measurement of time. Sense of mechanics or of construction. Talent which leads to perfection in the arts. (Dexterity.)

The external appearance of this organ is a rounded protuberance situated in the temporal region, sometimes behind the eye, sometimes a little higher, according to the developement of the neighboring organs.

20. Comparative sagacity. Faculty of discovering analogies and resemblances. Perspicacity. (Popular eloquence.) (Allegory.) (Apologue.)

A protuberance, which commences at the superior part of the forehead, and which descends, contracting itself in the form of an inverted cone, announces this faculty.

21. Metaphysical faculty. Depth of mind. Metaphysical penetration. (Faculty of abstraction and generalization.) Idiology.

This organ is formed of two prominences placed on the same horizontal line, one on each side of the preceding organ, of which they sometimes appear to be only a continuation.

22. Faculty of satire and repartee. Belesprit. Malicious spirit. Piquant disposition. Wit.

This disposition is indicated by a double prominence, or, as this must be always understood, by two circumvolutions, placed one on each side and behind those of the metaphysical faculty, and nearly on the same line.

23. Causality. Spirit of observation and induction, which refers effects to their causes. Reason of things. Philosophical head.

This faculty appears to be less the result of a special organ, than that of the conjoined developement of the whole anterior and superior part of the forehead. We may say it is a collective organ, which results from a happy assemblage of the superior faculties.

24. Organ of poetry. Poetic enthusiasm. Faculty of painting the thoughts in bright and glowing colors.

These dispositions belong to a protuberance situated at the summit of the head, on the median line, and behind the organ of theosophy.

25. Moral sense. Goodness. Mildness. Benevolence. Compassion. Sensibility. Conscience. Sentiment of just and unjust.

The organ of this faculty, perhaps one of the most imperious, is placed in the superior and lateral part of the head, a little above the temples.

26. Mimicry, or disposition to imitate the gestures, voice, manner, and actions of others.

These dispositions are owing to a developement of the circumvolutions placed upon the median line, at the anterior and superior part of the frontal bone, above the commencement of the hair.

27. Organ which disposes to visions. Love of the marvellous and supernatural. Illusion. Sorcery.

A prominence sometimes rounded, sometimes elongated, and situated a little behind and on one side of the organ of benevolence, is the external index of this disposition.

28. God and religion. Religious sentiment. Organ of theosophy or religious ideas. Veneration.

A circumlocution of the brain, situated between those which constitute the poetic faculty, and those which dispose to mimicry, appears to be the cause of this propensity.

29. Firmness. Constancy. Perseverance. Obstinacy. Disobedience. Mutiny. Seditious spirit. Independence of disposition.

A prominence placed on the median line, and which extends from the middle part of the front to the summit of the head, is the organic and innate source from which flows all creeds.

(To be continued.)

MONTHS.—This division of the year appears to have been used before the flood;* and as it is naturally framed by the revolutions of the moon, the months of all nations were originally *lunar*, that is, from one new moon to another. In a more enlightened period, the revolutions of the moon were compared with those of the sun, and the limits of the months, as the component parts of a year, were fixed with greater precision. The Romans divided each month into *Calends*, *Nones*, and *Ides;* the *Calends* were the first day of the month, the *Nones* were the seventh, and the *Ides* the fifteenth of March, May, July, and October; in the other months the *Nones* fell on the fifth, and the *Ides* on the thirteenth. The days of each month, according to this form, were counted backwards; thus, the 18th of October was called *the 15th day before the Calends of November, &c.*. In the year 1793, the French Government had a new calendar constructed, in which they adopted the following fanciful designations for each month:

	French.	*Signification.*	*English.*
AUTUMN—			
1.	Vindemaire,	Vintage month, -	from Sept. 22
2.	Brumaire,	Foggy month, - -	Oct. 22
3.	Frimaire,	Frosty or sleety month,	Nov. 21
WINTER—			
4.	Nivose,	Snowy month, - -	Dec. 21
5.	Pluvoise,	Rainy month, - -	Jan. 20
6.	Ventose,	Windy month, - -	Feb. 19
SPRING—			
7.	Germinal,	Springing or budding mo.	Mar. 21
8.	Floreal,	Flowering month, -	April 20
9.	Prairial,	Hay harvest month, -	May 20
SUMMER—			
10.	Messidor,	Corn harvest month, -	June 19
11.	Thermidor,	Heat month, - -	July 19
12.	Fructidor,	Fruit month, - -	Aug. 19

This *new* calendar, which, after all, was only a plagiarism, or copy of one used in Holland from time immemorial, like many of the absurb institutions which sprang from the French Revolution, was laid aside in a few years, from the circumstance of its utter unfitness for the seasons, even as they occur in the several provinces of France itself; how much less applicable, therefore, must they have been to other countries, where the climates and seasons vary so much from each other! A calendar, to be worthy of universal adoption, must be capable of universal application. Not so that of the French *Philosophers*, which, independently of its discordance with those of all civilized nations, had not even the merit of indicating those very seasons from which it professed to derive its character. The late Mr. Grifford ridiculed this new-fangled method of registering time by the following ludicrous but happy translation of the republican months and seasons:

AUTUMN . . Wheezy, sneezy, freezy;
WINTER . . Slippy, drippy, nippy;
SPRING . . . Showery, flowery, bowery;
SUMMER . . Hoppy, croppy, poppy.

THE POSSIBILITY OF NATURALIZING THE FIRE-FLY.—It abounds not only in Canada, where the winters are so severe, but in the villages of the Vaudois, in Piedmont. These are a poor people, much attached to the English, and at ten shillings per dozen would no doubt deliver in Paris, in boxes properly contrived, any number of these creatures in every stage of their existence, and even in the egg, should that be desired; and if twenty dozen were turned out in different parts of England, there cannot remain a doubt, but that in a few years they would be common through the country, and in our summer evenings be exquisitely beautiful.—[Mag. Nat. Hist.]

* Noah, as we find it recorded in the Bible, reckoned by months of thirty days each; and from him that mode of computing the year is supposed to have been adopted by the Chaldeans, Egyptians, and other Oriental nations.

A Compendium of Civil Architecture, arranged in Questions and Answers, with Notes, embracing History, the Classics, and the Early Arts, &c. By ROBERT BRINDLEY, Architect, Surveyor, and Engineer. [Continued from page 269.]

TUSCAN.

Q. Whence the origin of the Tuscan order?

A. It is ascribed to the people of Etruria, in Italy, immediately precursory to the Roman dawn of architecture, and claims its priority amongst the orders only by its simplicity and solidity. It bears decided marks of analogy to the Roman Doric; but is composed of few parts, nearly destitute of ornament, extremely massive, and now only used for vaulting, giving place to the Doric.

Q. What are the proportions of the pedestal?

A. It is a plain square block, in height two modules, and projects half the height of the plinth of the base beyond its face.

Q. Describe the column?

A. Including the base and capital, it is seven diameters or fourteen modules high; one of which is allowed for the capital. The upper part of the column is diminished two thirds of its height, making the diameter, under the neck of the capital, from one sixth to one fourth less than the base. This diminution is bounded by a curved line variously determined; but does not differ much from what an even spring would assume, if one part of it were bound in the direction of the axis of the shaft, to the cylindrical third, and then, by pressure at the top, only brought to the diminishing point. The shaft is never fluted.

Q. What of the base of the column?

A. It is one module high,—consisting of *plinth*, half a module; *torus*, quite plain, three eighths; *fillet*, or cincture, one eighth. The *apophyge*, parts of the shaft, as also all astragals under the capitals, in all rich orders, in masonry, should be executed on the shaft stones.

Q. Of what proportion is the capital?

A. It is one module in height, and consists of a *collarin neck* or *gorge*, sometimes called the frieze of the capital, in height one third of a module; the fillet or *cinture* one sixth of the gorge, above the apophyge; the ovolo one third of a module; and *abacus*, with a fillet, one third of a module.

Q. What is the projection of the capital?

A. Its greatest diameter across the abacus is two modules, and consequently projects one quarter of a module beyond the top of the shaft, being one half of a module less than the bottom. The ovolo projects one third of a module, and the abacus with a fillet, rather more.

Q. Describe the entablature?

A. It is quite plain, having neither mutules nor modillions; in height, three modules, consisting of architrave, three quarters of a module; frieze, one module; cavetto, one third; gaceiolatrio, one third; corona, one third; cima, one half. Sometimes the architrave has two faces.

Q. What is the projection of the entablature?

A. The architrave and frieze are exactly perpendicular to the bottom of the shaft; from the perpendicular line of which shaft, the cima projects one half of a module. The other parts gradually project more and more, being enumerated from the frieze upwards.

Q. What artist claims the honor of the Tuscan order?

A. Palladio. Some other Italian architects have varied in parts, and some have given a sort of block modillions, like those used in Covent Garden church; but these are wood, and ought not to be imitated in stone.

DORIC.

Q. To whom is the Doric order ascribed?

A. To the Dorians in general; but according to Vitruvius its origin is ascribed to Dorus, who built a temple to Juno, in the ancient city of Argos.

Q. What is the characteristic of this order?

A. It is of peculiar nobility, simple and bold, and called the *Herculean*.

Q. Did not the Romans considerably alter this order?

A. Yes; and by the regulations they introduced rendered it extremely difficult to be executed on large buildings. Hence two Doric orders are handed down to us.

GRECIAN DORIC.

Q. What are the proportions of the column?

A. In height, the column is eight diameters, or sixteen modules; the best example is six diameters, and is placed on the floor, without a pedestal or base, because men were in the habit of walking bare-foot. The roots of trees naturally suggested fluting.

Q. What is the proportion of the capital, and of what description?

A. The capital, which is one module in height, had no astragal, but a few plain fillets, with a channel between them, under the ovolo, and sometimes a small channel under the fillets. The ovolo is flat, with a quirk or return; on this was laid the abacus,

a plain tile, extending one third of a module beyond the perpendicular of the top of the shaft; the diameter of which is one fourth less than at the bottom.

Q. How is the entablature described?

A. The architrave and frieze are each more than a third in height, and the cornice less; the whole being two diameters high. The architrave has only a plain broad fillet; under which are placed the drops or guttæ, appearing to hang from the triglyphs.

Q. What is the disposition of the triglyph?

A. It is placed at the angle, bringing the interior edge over the centre of the column; and is an ornament peculiar to the style, having two triangular flutes forming a space between the grooves, equal to one module.

Q. Where is the metope?

A. Between the triglyphs, being the square of the height of the frieze; and a mutule was not only placed over each triglyph, but also over each metope; and it appears probable that the triglyphs were frequently omitted, except over the centre of each column. Hence the order would be easily worked at any desirable inter-columniation.

Q. What are the component parts of the cornice?

A. The cornice of this order consisted of a plain face under the mutules, which was measured as part of the frieze, and then the mutule, which projected, sloping forward under the corona, so that the bottom of the mutule was considerably lower in front than in the back. Over the corona was a small ovolo and fillet, and then a large ovolo and fillet for the cymatium.

Q. What are the ornaments of this order?

A. The flutings of the column, common to the order, are twenty in number, shallow, and not with fillets between them, but sharp edges. The flutes are much less than a semi-circle, and should be elliptic. At the corner, in the space formed in the soffit of the corona, by the interval of the two angular mutules, was sometimes placed a flower, and the cymatium of the cornice had lions' heads, which were real spouts. In addition to the guttæ, or drops under the triglyphs, the mutules have several rows of drops of the same shape and size.

Q. What is the projection of the entablature?

A. Generally one third of the diameter of the bottom of the pillar; sometimes, however, exceeding this.

ROMAN DORIC.

Q. What is the distinction in the Roman Doric?

A. First, the triglyphs must be precisely over the centre of the columns; 2d, the metopes must be exact squares; 3d, the mutules square, rendering the inter-columniation, in large buildings, to accommodate the internal arrangements, extremely difficult.

Q. What other distinction?

A. It is sometimes set on the attic base, which is one module and a third high; dado, two modules and a half; ovolo and fillets, half a module; base projects three quarters of a module; and ovolo, one module from the perpendicular of the column.*

Q. What are the mouldings employed in the pillar?

A. The plinth, in height, one third of a module; lower torus, one quarter of a module; cavetto, and upper and lower fillets, one sixth of a module; the upper torus, one sixth; cimbia, one minute and a half; astragal, four minutes.

Q. What is the proportion of the shaft?

A. The shaft, including the base and capital, each of which is half a diameter, is eight diameters, or sixteen modules high, and fluted like the Grecian.

Q. Describe the capital?

A. The capital, one module, has an astragal, collarin gorge, or neck, one third of a module, three fillets, three minutes; ovolo, one quarter of a module; abacus, one quarter of a module; cima recta, one sixth of a module.

Q. What is the projection of the capital?

A. The cima recta projects one third of a module beyond the perpendicular of the top of the shaft; the diameter of which is one quarter less than at the bottom.

Q. What of the entablature?

A. The architrave is only two thirds of the frieze, equal in height to the cornice. The architrave has sometimes two faces; frieze, nothing peculiar in this mode; cornice flat; mutules square, with square intervals; guttæ often omitted; cymatium, a cavetto, with ogee under; sometimes a cima recta; mutules have a small ogee running round them and the face of which they are formed; flat fillet, running round the top of the triglyph, belongs to the cornice; dentils sometimes used.

Q. What of the ornaments?

A. The order is susceptible of many, in addition to flutes, &c.: neck of capital has sometimes eight flowers or husks round it, the ovolo carved, and the metopes in the frieze filled with alternate ox-sculls and pateræ. In the interior, sometimes, the mouldings of the cornice are enriched.

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* This base is sometimes used in the Grecian Doric by the moderns.

GRECIAN AND ROMAN IONIC.

Q. To whom is this order ascribed?

A. It is ascribed by Vitruvius to Ion, who built a temple to Apollo, in Asia, and fixed the proportions of this most delicate order, sometimes called the feminine or female order, on account of its light and elegant appearance; the volutes, with the festoons, resembling locks of hair decorated with flowers.

Q. What is the distinction between the Grecian and Roman Ionic?

A. In Greece the volutes were placed flat in the front and back of the column, leaving the two sides of a different character, and forming a balustre. An angular volute was sometimes placed there, showing two volutes to each exterior face, and a balustre to each interior. The list or spiral line of the volute runs along the face of the abacus, straight under the ogee. In Rome a capital was invented with four angular volutes, and the abacus with its sides hollowed out. The list springs from behind the ovolo, and in the hollow of the abacus, which is an ovolo, fillet, and cavetto, is placed a flower.

Q. What are the proportions of the capital?

A. The height of the volute is seven minutes; ovolo, eight minutes; abacus, five minutes; projection of outermost circle of the volute exactly perpendicular to the line of the bottom of the shaft.

Q. Of what description is the pedestal?

A. It consists of plinth, half module high; base of pedestal, one quarter module; dado, one module and a half; cima reversa, one third module; projection of plinth and cima reversa, one third module.

Q. Of what proportion is the shaft?

A. Including the base (which is a half diameter, or thirty minutes,) and the capital, to the bottom of the volute, a little more, is nine diameters or nine modules high. It has several bases. Some of the Grecian examples are of one torus, two scotiæ, with astragal and fillet; others of two large tori and a scotia of small projection; but the attic base is often used, with an astragal added above the upper torus, making a beautiful base. The shaft may be fluted in twenty-four flutes, with fillets between them; these flutes are semi-circular.

Q. What are the entablatures of this order?

A. Three: 1st, plain Grecian; architrave often of one face; frieze plain; the cornice composed of a corona, with a deep soffit; bed-mould moulding hidden by the drip of the soffit, or coming very little below it, and sometimes with a plain dentil set close under the corona, the cymatium, a cima recta, and ogee under it. The whole height of entablature is one module and three quarters; architrave and frieze each forty minutes. 2d, mostly used with the Grecian capital at Rome, has generally two faces in the architrave; and the cornice, which is rather more than one third of the entablature, has the corona, with a cima recta, and ogee, for cymatium; and for bed-mould, a dentil face between an ovolo and ogee; the soffit of the corona sometimes ornamented; height of entablature one module and three quarters; architrave, twenty-eight minutes; frieze, thirty-eight minutes; corona, forty minutes. 3d, *modillion entablature*—same architrave, frieze, and cymatium of its cornice as last, under the soffit of the corona are plain modillions, surrounded by a small ogee, one placed over the centre of each column, and placed close to the return, making a square panel on the soffit; in the corner, between each modillion, there is often a flower—bed-mould below an ovolo, fillet, and cavetto.

Q. What projection is the cornice?

A. Half a module beyond the perpendicular line of the bottom of the column.

NOTE.—It was once the custom to work the Ionic frieze projecting like a torus, which impropriety has been driven out by improved Grecian models. This order can be ornamented by carvings.

CORINTHIAN.

Q. From whence has the Corinthian order arisen?

A. It had its name and origin from Corinth; and the many remains of antiquity show the prevalence of this order amongst the ancients; though the Romans annihilated every vestige of it in the destruction of their great and rival city, by L. Mummius, A. C. 146.

Q. What is the character of this order?

A. The general character is lightness and extreme elegance; in which qualities it is superior to the Ionic. The latter resembles a matron, and the former a virgin.

Q. What is the great mark of distinction in this order?

A. The capital, having arisen out of the two former orders; and is said to have been further suggested by observing a tile placed on a basket left in a garden, and round which sprang up an acanthus.*

Q. What are the component parts of the pedestals of the column?

A. They are the same as the Doric and Ionic, but more elegant, and ornamented.

* All the other orders have in different countries and situations much variety: but the Corinthian, not without slight variations, even in the antique, is much more settled in its proportions; and its greater or less enrichment is the principal order of variety.

The pedestal, in height, should be one fourth of the column.

Q. Of what proportion is the column?

A. Including the base, of half a diameter, consisting of several annulets and fillets, and the capital, one diameter, it is twenty modules or ten diameters high.

Q. Describe the capital?

A. The height is rather more than the diameter, consisting of an astragal, fillet, and apophyge, all measured with the shaft; then a bell and horned abacus. The bell is set round with two rows of leaves, eight in each row; and a third row of leaves supports eight small open volutes, four of which are under the four horns of the abacus, and the other four, often interwoven, are under the central recessed part of the abacus, and have over them a flower or other ornament; the volutes spring out of small twisted husks placed between the leaves of the second row, called *caulicoles*. The abacus consists of an ovolo, fillet, and cavetto, like the modern Ionic. There are several modes of indenting the leaves, called, from these variations, acanthus, olive, &c.

Q. What of the entablature of this order?

A. It is very fine, being one fifth of the column in height, resembling the Ionic. The architrave has mostly two or three faces, with small ogees or beads between them, being thirty-five minutes in height. The frieze is flat, often joined to the upper fillet of the architrave by an apophyge, thirty-five minutes. The cornice, forty minutes high, has modillions and dentils, thus composed: above the corona is a cymatium and small ogee; under it, the modillions, whose disposition, like the Ionic, must be over the centre of the column, and one close to the return of the cornice; these modillions are carved with a small balustre front, and a leaf under them, surrounded at the upper part by a small ogee and fillet running round the face from which they spring. Under the modillions is placed an ovolo, then a fillet and a dental face, often left uncut in exterior work; under the dentils are a fillet and ogee.

Q. What is the projection of the cornice?

A. Like the Ionic, it projects half a module beyond the perpendicular line of the bottom of the column.

Q. What are the enrichments of this order?

A. They may be very considerable: mouldings of pedestal enriched; shaft fluted, like Ionic, in twenty-four flutes, filled one third high by staves, called *cabling* the flutes; mouldings of architrave and even faces; mouldings of corona; squares of soffit of corona panelled and flower; frieze adorned with carvings. A redundancy of ornament for exteriors, however, is an evil.

COMPOSITE.

Q. Whence the origin of this order?

A. It was composed from the Corinthian and Doric orders, by the Romans—hence called the Roman Composite.

Q. What is the distinguishing feature?

A. The capital—having a bolder appearance than the Corinthian.

Q. What of the pedestal?

A. The same as the Corinthian in proportions.

Q. What of the column?

A. It is twenty modules or ten diameters high; fluted and based like the Corinthian.

Q. What height is the capital?

A. One diameter, and formed by setting, on the two lower rows of leaves of the Corinthian capital, the modern Ionic volutes, ovolo, and abacus. The small space left by the bell is filled by caulicoles, with flowers; and the upper list of the volute is often flowered.

Q. Describe the entablature?

A. It has only two faces to the architrave; upper mouldings bolder than the Corinthian. The cornice is different, having a sort of double modillion, consisting of two faces, the upper projecting farthest, and separated from the lower by a small ogee. Under the modillion is commonly a large ogee, astragal, and fillet. A plain cornice is sometimes used to this; and also a cornice with the modillions bolder, and cantilivers under them in a frieze. In height the cornice bears the same proportion as that of the Corinthian.

ORDERS OF SACRED TEMPLES OF THE GREEKS.

Q. What were the orders of the sacred temples of the Greeks?

A. They were seven, namely, Antis, Prostyle, Amphiprostyle, Peripteral, Dipteral, Pseudo-dipteral, and Hypæthral.

Q. What is the order of Antis?

A. The Antis is that wherein the ends of the flank walls finish in pilasters, or antæ, and have two columns between them, such as Inigo Jones' fine Tuscan portico of St. Paul's church, Covent Garden.

Q. Describe the Prostyle?

A. This differs from the Antis, by having columns added opposite the pilasters, or antæ of each corner, with others intermediate. The foregoing orders have only porticos at one end.

Q. What is the Amphiprostyle?

A. The same as the Prostyle, but, as its name imports, with a posticum, or rear front, the same as the principal front.

Q. What is the Peripteral?

A. This order has also porticos at both ends of six columns, and eleven, counting the angle columns on each side. It had, as signified, columns all round about the cell, as in the temple of Theseus, which has two more columns in flank than the rules of Vitruvius prescribe.

Q. What of the Dipteral?

A. This order, which Vitruvius places after the Pseudo-dipteral, is Octastyle, or eight columned, like the Portico of the Parthenon, but has a double row of columns round the cell.

Q. What of the Pseudo-dipteral, or false Dipteral?

A. The porticos are Octastyle, or eight columned in front, and on each side fifteen, counting those of the angles. The Parthenon is of this order of temples, but has seventeen columns on the sides—the Greeks not confining themselves to every rule of the critic, yet never losing the true spirit of the original.

Q. Describe the Hypæthral order of temples?

A. This order is Decastyle, or ten columned, both in front and rear; the other parts are distributed the same as the Dipteral, but it has in its *interior* a double row of columns, one higher than the other, continued on all sides, and resembling an interior porch, and is called, from its situation, a Peristyle. The middle part has no roof. A fine example of this order of temples is to be found in that of Jupiter Olympus, at Athens. In Rome there is no example of it.

Q. What is the description of the *circular* temples?

A. They do not class under any of these orders. Some of these temples are denominated *Monopteral*, having one row of columns round about them, and no cella. Others are called *Peripteral*, having a cell round which the columns are arranged, standing on a continued pedestal, designated a *Stylobate*, like the temple of the Sybils, at Tivoli, the choragic monument of Lysocrates at Athens, and the temple of Vesta at Rome.

INTERCOLUMNIATION OF ORDERS.

Q. What is to be comprehended by the intercolumniation of orders?

A. It signifies the manner of distributing the columns according to regulations formed on good taste, reason, beauty, and strength.

Q. How are the columns disposed?

A. They are either insulated or engaged.

Q. What are insulated columns?

A. Columns detached from the wall, either very near or at a considerable distance from it.

Q. When at a distance from the wall, for what purpose are they?

A. To support an entablature; and the distance from each other should be consistent both with their real and apparent solidity.

Q. What are engaged columns?

A. Columns attached to the wall, and are not limited in their intercolumniations, as they depend on the breadth of the arches, doors, windows, niches, or other decorations placed between them.

Q. What different species of intercolumniation did the ancients use?

A. According to Vitruvius and Palladio they are as follows: 1st, the *Pycnostyle*, of which the interval or space is one and a half inferior diameter of the columns—of this style are the Parthenon, and temple of Theseus; 2d, the *Systyle*, whose interval is two diameters; 3d, *Eustyle*, two diameters and a quarter; 4th, *Diastyle*, three diameters; 5th, *Aræostyle*, four diameters. The first three of these were used by the Grecians, in the Doric, Ionic, and Corinthian orders; but the distance of the triglyphs of the Doric determine the intercolumniations of that order.

Q. Which intercolumniation had the preference amongst the ancient Romans?

A. The Eustyle in most cases, as the best medium of the too little and too great intervals of the column; but in their Tuscan works they used a space equal to four, and sometimes six, diameters, which intercolumniation was admissible in this order, since the architrave was usually formed of some kind of timber when the other parts of the entablature were of stone.

Q. What observation has Palladio made on this subject?

A. That "this intercolumniation was adopted to farm-houses and other rustic work, as it afforded a passage for carts, and was least expensive. In structures, however, built entirely of stone, they used a shorter interval, more suitable to the length of their blocks of marble." Hence the diastyle and eustyle modes were sometimes applied to this order. This style appears to be adopted to every order by the moderns, excepting the Doric.

Q. What modern contrivance is sometimes adopted as regards the aræostyle, authorized by a few examples of the ancients introduced into porticos and peristyles?

A. A mode adopted by Perrault, and is managed by placing two columns together, at the angles, so close as to admit the two capitals nearly into contact; the intermediate columns are similarly placed. This man-

ner, which is termed *grouping*, takes off from the excessive width of this kind of interval, whilst it adds to it both real and apparent strength. Examples are found in St. Paul's Cathedral, and St. James' Park, London, and in the Palace of the Loire, at Paris.

Q. What of the intercolumniation of the Doric order?

A. It is often attended with peculiar difficulty, arising from the strict regard that is ever paid to the true width of the triglyph, and the perfectly square form of the metopes or their intervals. In some instances, the mutules and triglyphs have been omitted in capital works, both ancient and modern, as in the Colosseum, at Rome, and the Royal Hospital, Greenwich.

Q. How is the intercolumniation of the Doric effected, when the capitals and bases have their proper projections, and are at any distance from each other?

A. The metope between them will be rather too wide; but that may be obviated by confining the projections, or making the triglyph one minute more than it really should be, and placing or removing its centre one minute within the axis of the column, which trifling distance will not be perceived without the nicest examination.

TRIUMPHAL ARCHES.

Q. What is to be advanced upon the subject of triumphal arches?

A. They were much used among the ancients, with various decorative ornaments: some had their piers rusticated, others adorned with pilasters, termini, or caryatides, and sometimes they were made sufficiently broad to admit of niches or windows.

Q. Of what description was the circular part of the arches?

A. They were either surrounded with rustic key-stones, or with an archivolt enriched with mouldings, which in the middle is sometimes interrupted by a *console*, or mask, serving at the same time as a key to the arch.

Q. How is the archivolt supported?

A. By an impost at the head of the pier, and at others by columns placed on each side of it with a regular entablature or architrave and cornice.

Q. From whence does the circular part of arches of great magnitude spring?

A. Not immediately from the impost, but takes its rise at such a distance above as is necessary in order to have the whole curve seen at a proper point of view.

Q. What is the proportion of the void or aperture of arches?

A. It should never be higher nor much lower than double their breadth.

Q. What is the size of the pier?

A. The breadth of the pier should not exceed two thirds, nor be less than one third, of the breadth of the arch; and the angular pier ought to be broader than the others by one half, one third, or one fourth.

Q. Of what thickness should the pier be?

A. This depends on the breadth of the portico. It must be strong enough to resist the pressure of the vault.

Q. Of what proportion should the impost be?

A. Not more than one seventh, or less than one ninth, of the aperture.

Q. What of the archivolt and console?

A. The archivolt is from one eighth to one tenth of the aperture. The breadth of the console must, at the bottom, be equal to that of the archivolt, and its sides drawn from the centre of the arch; the length of it should not be less than one and a half of its smallest breadth, nor more than double the same.

Q. What are the proportions of the Tuscan arch without pedestals?

A. In height the aperture is seven diameters and a quarter; in width, four diameters; and from centre to centre of the columns, six diameters; plinth, one diameter in height; columns, agreeably to order.

Q. What are the proportions of this order with pedestals?

A. In width, four diameters and a half; in height, eight diameters and a quarter; from centre to centre of each pedestal, six diameters and three quarters.

Q. What are the proportions of the Doric order without pedestals?

A. In height, seven diameters and three quarters; in width, four diameters and fifteen minutes; piers, two modules in front; in thickness, one module, twenty-two minutes and a half, or in proportion to their distance from the wall; from centre to centre of each pier, six diameters and fifteen minutes.

Q. What are the proportionate arches of this order with pedestals?

A. Their apertures in height are nine diameters, thirty minutes; in width, five diameters, fifteen minutes; pier, two diameters, fifteen minutes wide; in front, and from centre to centre of each, seven diameters, fifteen minutes.

Q. Of what dimensions are the arches of the other orders?

A. They bear analogy to these last mentioned, differing but little in proportion, and only discovered by the character of the ornaments; beautiful specimens of which are to

be met with at the entrance of the metropolis and the king's palace.

Ancient Marks on Paper.—Every one knows how often we are obliged to refer to ancient times to explain common terms of art, and words which are in every one's mouth. We have a curious instance of this in the names which are given to the different sorts and sizes of paper. We all talk of *foolscap-paper*, *post-paper*, and *note-paper;* and paper-makers and stationers have other terms of the same kind, as *hand-paper*, *pot-paper*, &c. Now, the term note-paper is clear enough, as it evidently means paper of the size fit for notes; while *post-paper*, we may suppose, means the larger size, which is used for letters sent by the post. But when we come to *foolscap* paper, we are altogether at a loss for an explanation; and here we find we must look to something else than the size of the paper as to the origin of the name. Now, if we go back to the early history of paper-making, we find that terms which now puzzle us so much may easily be explained by the various paper *marks* which have been used at different times. In ancient times, we know, when very few people could read, pictures of every kind were very much in use where writing would now be employed; every shop had a sign, as well as every public house; and these signs were not then, as they very often are now, only printed on a board; they were always either painted pictures, as many inn signs still are, or else models of the thing which the sign expressed, as we still sometimes see a bee-hive, a tea-canister, or a doll. For the same reason, printers had always some device which they put upon the title pages, and at the end of their books; and paper-makers used marks to distinguish the paper of their manufacture from that of others. Some of these marks becoming common, naturally gave their name to different sorts of paper; and as names, we all know, remain very long after the origin of them is forgotten, and the circumstances changed, we shall not be surprised to find the old names still in use, though perhaps in some cases they are not applied to the same things they originally denoted. It will be the best way, perhaps, to mention briefly the chief paper marks which have been used, as they occur in the order of time. The first paper-maker in England is supposed to have been John Tate, who is said to have had a mill at Hertford; his device was a star of five points within a double circle. The first book printed on paper manufactured in England was a Latin one, entitled *Bartholomeus de Proprietatibus Rerum*. It was printed in 1495 or 1496. The paper seems to have been made by John Tate, the younger, and had the mark of a wheel. The paper used by Caxton, and other early printers, had a great variety of marks, of which the chief are the ox-head and star, the letter P, the shears, the hand and star, a collared dog's head, with a trefoil over it, a crown, a shield, with something like a bend upon it, &c. The ox-head, sometimes with a star or flower over it, is the mark of the paper on which Faust printed some of his early books; but the open hand, which was likewise a very ancient mark, remained longer in fashion, and probably gave the name to what is still called *hand-paper*. Another very favorite paper mark, at a somewhat later period, was the jug or pot, which seems to have been the origin of the term *pot-paper*. It is sometimes found plain, but oftener bears the initials or first letters of the maker's name; hence there is a very great variety of figures, every paper maker having a somewhat different mark. The hand and pot marks existed from 1539 to 1639, as may be seen in old Bibles. The foolscap was a later device, and does not seem to have been nearly of so long continuance as the former. It has given place to the figure of Britannia, or that of a lion rampant, supporting the cap of liberty on a pole; the name, however, has continued, and we still denominate paper of a particular size by the title of foolscap paper. The figures have the cap and bells which we so often read of in old plays and histories, as the particular dress of the fools, who formerly formed a part of every great man's establishment. Post-paper seems to have derived its name from the post-horn, which was at one time its distinguishing mark. This is of later date, and does not seem to have been used before the establishment of the General Post-Office, when it became the custom to blow a horn. This mark dates from 1670 to 1679. The mark is still sometimes used; but the same change which has so much diminished the number of painted signs in the streets of our towns and cities, has nearly made paper marks a matter of antiquarian curiosity, the maker's name being now generally used.—[Saturday Magazine, No. 11.]

Carriages.—Wheel carriages for pleasure are generally supposed to have first come into use in England in the reign of Queen Elizabeth. But long before that time carriages of some sort were used on state occasions, or for the conveyance of sick persons. Even in the time of the Saxons, a clumsy kind of car, on four wheels, was

employed to carry great personages; and Stow tells us, that, during Wat Tyler's insurrection in 1380, Richard the Second, "being threatened by the rebels of Kent, rode from the tower of London to the Miles End, and with him his mother, because he was sick and weak, in a *whirlicote*," which is supposed to have been a sort of covered carriage. "Chariots covered, with ladies therein," followed the litter in which Queen Catherine was carried to her coronation with Henry the Eighth. But Queen Elizabeth's is the first that was called a *coach*. In 1564 William Booner, a Dutchman, became the Queen's coachman, and about this time coaches were brought into general use in England. In 1588 Queen Elizabeth went from Somerset House to Paul Cross, to return thanks on the destruction of the Spanish Armada, in a coach presented to her by Henry, Earl of Arundel. These coaches must have been clumsy uncomfortable machines. They had no springs, and the state of the streets and roads must have made travelling in them any thing but easy. But fashion brought them into such general use, that in 1607 Dekker complains that "the wife of every citizen must be jolted now." And in 1636 there were 6000 of them kept in London and the neighborhood. At first they had only two horses, but afterwards the number was increased. In the reign of James the First, "the stout old Earl of Northumberland, when he was got loose, hearing that the great favorite Buckingham was drawn about with a coach and six horses, thought he might very well have eight in his coach, with which he rode through the city of London to the vulgar talk and admiration." In general, however, it was thought disgraceful in those times for the male sex to ride in coaches. "In Sir Philip Sydney's time, so famous for men at arms, it was then," says Aubrey, "held as great a disgrace for a young gentleman to be seen riding in the streets in a coach, as it would now for such a one to be seen in the streets with a petticoat and waistcoat, so much is the fashion of the times altered." Sir Walter Scott says, it is a tradition in Scotland, that chaises or chariots were first introduced into that country in 1745. Before that time the nobility were accustomed to travel in vehicles somewhat resembling Noah's ark, and the gentry on horseback; but in that memorable year, the Prince of Hesse appeared in a carriage of this description, "to the admiration of all Scotchmen, who regarded it as a coach cut in half." When we compare the clumsy things in which even our kings formerly rode, with the convenient and light carriages of the present day, we cannot help admiring the progress which our workmen have made in this and every other branch of art, and hoping that their skill may always find that encouragement which it so well deserves.—[From a paper in the Archæologia, by J. H. Markland, Esq.]

Popular Whims and Superstitions, relating more especially to the Practice of Medicine in the Nineteenth Century. By W. [From the Scientific Tracts and Family Lyceum.]

Some of the popular superstitions of the present day, respecting the practice of physic, may show the errors with which physicians have to contend. They may likewise show that information has not extended among the people at large to so great a degree as is generally believed. They may be curious relics for succeeding generations. They will teach that men of the present day, who are uneducated, have made but a small advance from the Goths and Vandals of ancient Europe, and from the Greeks and Romans, who prognosticated future events from the writhing entrails of dying birds and beats. Science, and that alone, will ultimately remove these errors; but, in the language of an elegant writer, "Before truth, in its silent and disputed march, has roused the attention of the indolent, converted the supercilious, subdued the interested and obstinate, and reached the ears of all, an age has passed away."

Whim 1st. It is a general belief that the green bark of elder, (*Sambucus canadensis*,) scraped up the stalk, and taken in decoction, will produce vomiting; scraped down, it will produce a cathartic operation. An intelligent physician, who heard the observation, humorously remarked, "Yes, and scraped round the stalk, it will pass directly out at the navel."

2d. Take a live black snake, and bite him through from his head to his tail, and the teeth will never afterwards ache or rot.

3d. Another. To prevent future attacks of the tooth-ache, extract a tooth, and bore a hole with an auger into the *north side* of a white oak tree, and place the tooth therein. Plug up the hole, and the remaining teeth will never ache until the plug decays.

4th. In colic, inflammation of the bowels or inflammatory rheumatism, skin a sheep or a cat *alive*, or open a hen alive, and apply her, or the warm skins of the animals, to the affected part, and they will immediately relieve and cure the disease.

Remark.—That warmth may be serviceable in these complaints is undoubtedly true,

but the same benefit would unquestionably result from applying an emollient poultice.

5th. Steep the excrements of a sheep or lamb in cider, and give it to a patient in the measles, and it will effectually force out the eruption. This is known by the name of "nanny tea."

6th. To cure the epilepsy, or falling-sickness fits, procure the upper part of the skull of a dead man, pulverize and take it every day until the patient is cured.

7th. Wearing a red string or a string of gold beads round the neck will cure or prevent the nose-bleed. Wearing a tansy-bag on the stomach will cure worms.

8th. Throwing a woman's milk into the fire will dry it up in her breasts. Milk a cow upon the ground, and you will dry up her milk. If you kill a toad, it will cause your cow to give bloody milk.

9th. Innumerable are the whims and superstitions with regard to the cure of warts. Caustic and the knife will undoubtedly eradicate them. Sometimes they will go off of themselves.

Steal a piece of fresh meat and bury it; as the meat rots, the warts will disappear. Throw the meat into a neighbor's well, and the warts will recede, and your neighbor will have them.

10th. The membrane which frequently invests the head and body of a child at birth is called the veil; take this veil, wash it, and lay it into a drawer. If any of your family are absent, at whatever distance, whenever you examine this veil, if it is red, you may be sure that the absent person is well, but if it is pale, you may be sure that he is dead. If you examine it every day, you can tell the day he died.

11th. *Sayings upon child-birth.*

Monday, fair in the face;
Tuesday, full of grace;
Wednesday, sour and sad;
Thursday, merry and glad;
Friday, loving and giving;
Saturday, work hard for a living;
Sunday, never to want.

12th. Nail a horse-shoe over the threshhold of your door, and it will drive off witches.

"The sacred horse-shoe, guardian of the whole,
Terror of sprites profane and witches foul,
Dread, powerful talisman, 'gainst imps unknown!
Nail'd on the door, in silent mystery shone."

This superstition is of ancient date, but it is much believed in by the ignorant at the present day.

13th. The belief in the divining rod is prevalent. The rod is of witch-hazel, (*Hamamelis virginica.*) Whenever the conjurer walks over the ground where the supposed mineral is, the rod will incline towards the mine.

14th. The moon, with many people, has a great influence upon the operations of husbandry, manufactures, and many diseases. It is believed that you cannot make good soap in the old of the moon; but if you make it in the new of the moon, and when the tide is coming in, you will uniformly be successful. So of killing hogs: if you butcher them in the new of the moon, or when it is nearly at its full, your pork will swell in the pot while boiling; but if you kill them at the old of the moon, or when it is in the wane, your pork will shrink in the pot. Particular attention must be paid to the state of the moon in pruning your trees, sowing grain, and other operations of husbandry. The moon, likewise, has great influence upon the weather.

15th. Nearly akin to the superstition with regard to the moon is the belief of certain signs respecting the singing of birds, upon the weather. The whistling of a quail, the singing of the robin and of the cuckoo, and the singing of tree-toads, are certain signs of the immediate approach of rain.

16th. You must not *commence* any work upon Friday, or engage in any new business; if you do, you will be sure of being disappointed.

17th. In case of amputated limbs, the belief is that the limb cut off feels every impression upon it—in the same manner that it did before it was amputated. If it is heated by the fire, the patient also feels heat; if it be struck, the patient likewise feels the blow.

18th. *Consumption.*—A superstition somewhat common among the most illiterate classes of the community is, that if the portions of the lungs which remain after a friend has died with the consumption, be taken out and burnt, the remainder of the family of the deceased will never afterwards be liable to the complaint. I have known the bodies of three or four people, who had died of consumption, disinterred, some of whom had been buried six or seven years, and their viscera burnt to ashes. What is remarkable, a physician attended as master of the ceremonies.

19th. But of all the superstitions with which we have to contend, that of resorting to patent secret medicines, and to patent steam-quacks, is the most common, the most humiliating, and the most degrading. Other superstitions debase the human mind; these sport with and destroy human life. In continental Europe the sale of secret remedies is prohibited by law, while in England and the United States it is made profitable to the government. "Ignorance and credul-

ty," says Dr. Darwin, "have ever been companions, and have misled and enslaved mankind." W.

April 23, 1834.

PENNSYLVANIA COMMON SCHOOLS.—We rejoice that the great state of Pennsylvania has at length adopted a system for the management and direction of her common schools, and that its features are, in the main, so excellent. From the report acknowledged in our last number, from the Hon. Samuel Breck, to whom the state is indebted for preparing and carrying through the measure, and the amended act, since become a law by the signature of the Governor, we learn that the fund established in that state in 1831, for the aid of common schools, now amounts to $546,563, and will soon be $2,000,000. The new bill appropriates $75,000 of its revenue for the year 1835, and the same annually thereafter, until the fund yields $100,000, to be applied to those districts which comply with the conditions of the new act. This act makes each county in the state a school *division*, and every ward, township, and borough in each, a school district, which district shall contain a sufficient number of schools for the education of all within its limits who shall be offered. This new division of the state does not, however, interfere with the special regulations made by former acts for the city and county of Philadelphia.

The new statute requires that every district shall have six school directors, two of whom shall be elected annually. Their duty is to determine the number of schools which shall be necessary; to procure proper buildings; "to appoint capable teachers, at liberal salaries," and provide generally for the operation of the schools. They are to receive no compensation for their services, but an exemption from serving in the militia, or in township and borough offices. Two or more of the directors must visit the schools, at least once a month, and make an annual report to the *inspectors*.

The inspectors are two persons in each district, appointed annually by the courts of quarter sessions. Their business is to visit every school at least once in three months; to inquire into the moral character, learning, and ability of the teachers; examine candidates for teaching; and grant certificates, for one year only, to those who shall be found qualified. They may require teachers to be examined publicly. They must also investigate the condition of the schools, as to the progress of the pupils, and their discipline, the character of the teachers, the branches taught, &c., and report annually, to the superintendent; which report must be published. Their only compensation is the same as that of the directors.

The Secretary of the State is to be the Superintendent of the schools, whose duties, as defined by the statute, are nearly the same with those of the Superintendent of Common Schools in the state of New-York. He must also settle all controversies that may arise in regard to the duties of inspectors and directors, and in regard to school money.

In order to prevent the school fund from excusing individual exertion, and to make it operate as a stimulus, an annual joint meeting, of one delegate from each board of district directors in a county, together with the county commissioner, shall be held, who shall determine whether a tax is necessary to meet the school expenses. If they determine a tax to be necessary, it shall be levied; but no tax shall be less in amount than *double the sum furnished them from the revenue of the school fund*. But if they determine that no tax is necessary, the districts whose delegates voted in the negative shall not be entitled to any aid from the school fund for that year; but the money to which they would otherwise have been entitled shall be divided among those districts whose delegates voted in the affirmative. If no tax is voted, the old law shall be considered in force, without any regard to the school fund. If a tax is agreed upon, a public meeting of the citizens of each district shall be called, who may increase the tax, if they think it necessary. This last is one of the most valuable portions of the bill.

A majority of four in six of the directors may connect manual labor with study, in their several districts, and purchase the necessary materials, and employ persons to instruct the pupils in the mechanic arts and in agricultural pursuits, whenever they think it expedient.

The bill, as it came from the hands of the committee, made provision for the education of teachers,* but the amendments of the Senate excluded it. A less important section, which required the teachers in the several

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* One *petition* was presented against the provision for the education of teachers. The following letter of a schoolmaster from the same county, which we copy *literatim* from the Philadelphia Gazette, may suggest the reason:

"I take the pen in Hand to Notice you That I wand that money Where your Son went to School to me last Winter to me Henry Krebs in ———— and I shall write you the bill of his Schooling Where he went is 42½ Cents and a half and the amount of the Rens 11 Cents and so the whole amount is 53½ cents and So I have no more to write at present Henry Krebs his hand and pen august the 15th 1833 &c

HENRY KREBS."

divisions to adopt, yearly, *a uniform course of study* to be pursued by *every school in the division*, shared the same fate.—[Annals of Education.]

Attempt to assign the Cause of the Spontaneous Combustion of Charcoal. By Mr. John Davies, Member of the Wernerian Society of Edinburgh, &c. and Lecturer on Chemistry, &c.

In the above interesting paper, no attempt has been made by the author of it to furnish an explanation of the phenomenon which he has established and described; and as every inquiring mind will direct its attention to a rationale of the operation, I presume that some remarks which have occurred to me within the few last days, and which may at least supply some aid in the discussion, may be without impropriety appended to the paper. These remarks, though theoretical, are countenanced by experimental analogies, which, if they fail to establish the accuracy of the speculation, may, at least, excuse its introduction.

A statement of the mode in which the charcoal in question is made, will be necessary in the subsequent explanation. Small fragments of wood, generally stripped of their bark, are put into iron cylinders, and exposed to intense heat, in order to effect the distillation of the volatile constituents for the manufacture of iron liquor. Now, Mr. Brunner resorted to a similar procedure in obtaining potassium from potash and charcoal; and as we know that potash may be procured from the wood employed by Mr. Hadfield, we have in his manufacture the same operation and the same materials as in M. Brunner's experiment, and may therefore expect the same results. The only difference would be, that as M. Brunner used much potash, he procured a large proportion of the metallic base; while in the other case the potassium must be in small quantity, because all the potash present would be only that supplied by the wood subjected to distillation: and yet, upon the whole, the quantity extracted under the latter circumstances is not inconsiderable; for it is by the combustion of such wood in America, where it is of comparatively little value, that the potash is principally formed which is consumed in the arts and manufactures in every part of Europe.

It is manifest, therefore, that in the formation of Mr. Hadfield's charcoal, potassium must, in small quantities, be liberated.

Supposing the presence of potassium in fresh charcoal to have been established, we have now to explain its operation; and this appears to be effected upon the assumption that the metal lingers in the pores of the charcoal, incased, as it were, in the substance, until it be at length exposed to the action of atmospheric air and aqueous vapor. This view of the subject derives plausibility from the facts, that the combustion does not commence at any considerable depth below the surface; and that when a thermometer is introduced into the mass, the ignition generally originates in that place; that is to say, the combustion occurs exactly where it might be expected, since it takes place at the part which, favorably situated, is most exposed to the action of the supporter of combustion.

This general view of the spontaneous combustion is directly countenanced by the excellent paper of Colonel Aubert, inserted in the "Bulletin des Sciences Militaires" for January, which Mr. Hadfield has offered me the opportunity of consulting. This ingenious foreigner shows by a number of decisive experiments, that the absorption of air and moisture is indispensable in the production of the phenomenon. He proves also, (what Mr. Hadfield has in a different way very clearly confirmed,) that no carbonic acid is formed before the incandescence occurs—a fact strictly in accordance with the hypothesis which I have offered; since upon this hypothesis the oxygen of the air, instead of forming an acid with the carbon, produces, by its superior affinity, an alkali with the potassium. The next position which he establishes, is that the carbon increased in weight in proportion to the quantity of air and moisture absorbed; and this should, according to the explanation suggested, occur, the alkali formed being much heavier than its metallic base. It appears that, to produce the ignition, the charcoal should not only be reduced to powder soon after its formation, but that the sooner it is so reduced the more certain and considerable will be the effect. Now, this fact also is entirely consistent with the explanation, because, when the pulverization has been delayed, air and moisture will have gradually produced the alkali, by a process imperceptible, because the minute portions of potassium would be at comparatively distant intervals from each other, and thus would not be in sufficient quantity at any one place to produce a sensible effect.

Colonel Aubert pulverized a mixture of coal and sulphur, and he found that under these circumstances no ignition ever occurred. The reason is obvious: for the potassium, which has been conceived to be the cause of the combustion, entered during the

trituration into combination with the sulphur.

He also triturated charcoal with nitre, and he again found that the spontaneous combustion was prevented. Now nitre, by mingling with the potassium, would check its too rapid absorption of oxygen; and the effect of his experiment is in this way sufficiently accounted for.

The presence of the potassium seems to account for the circumstance, that when charcoal is moistened and subjected to heat, carburetted hydrogen is set at liberty. In this instance it would appear that the water is decomposed, the hydrogen evolved, and the oxygen united with the potassium to form the alkali. If the heat be continued, carbonic oxide would be evolved; the oxygen absorbed in the first part of the operation being again detached from the metallic base. Now this explanation corresponds precisely, I believe, with the order in which, in such an experiment, these gases are produced.

All these circumstances observed by Mr. Hadfield and Colonel Aubert appear, therefore, perfectly reconcilable with the supposition that the spontaneous incandescence is owing entirely to the oxidation of the potassium liberated from the wood during the manufacture of the charcoal.

Dr. Thompson, in the second volume of his History of Chemistry, published since my paper was read to our society, has thrown additional plausibility upon my explanation, by his attempt to show that phosphorus owes its property of catching fire, when in contact with oxygen, to a little potassium, which is reduced to the metallic state during the formation of the phosphorus.—[Phil. Mag.]

Correct Fusing Points of Metals and Alloys, and other important Temperatures, upon various Thermometrical Scales. [From the Repertory of Arts, &c.]

In the thirteenth edition of Parkes' Chemical Catechism, edited by Mr. Brayley, jun., which has just appeared, we find a "Table of the Effects of Heat," (p. 606), in which the higher temperatures have been corrected by the editor, agreeably to the pyrometrical researches of Mr. Daniell and other chemists. As we do not remember to have seen any connected view of the results, as to the correct fusing points of metals and alloys, &c., which Mr. Daniell has obtained by the use of his new register pyrometer, we subjoin an extract from this table, containing the temperatures from 212° upwards. It may be requisite to state, for the information of such of our readers as may not be acquainted with the present state of pyrometry, that Mr. Daniell has shown (as we find it explained by Mr. Brayley at p. 70, *notes*, of the Chemical Catechism,) that "the degrees (above the zero of 1077° Fahrenheit, which is stated to be a red heat visible in the daylight,) of Wedgwood's pyrometer, instead of being equal to 130° of Fahrenheit, as supposed by its inventor, are equal only to about 20°;" and that consequently the *range* of that instrument, instead of including 3200 degrees of Fahrenheit, did not really include more than about 5000°: this will account for the great difference of the corresponding temperatures of Fahrenheit, &c., and Wedgwood, as here stated from the new edition of the Chemical Catechism, from those given in former editions of that work, and also in many other publications on chemical subjects.

Fusing Points, &c. on the scales of	Fahr.	Reau.	Cent.	Wedg.
Water boils, and "fusible metal" [$\frac{8}{16}$ bismuth, $\frac{5}{16}$ lead, $\frac{3}{16}$ tin, smelt]	212	80	100	
Sulphur melts . . .	216	89	111	
Nitrous acid boils . .	242	93	116	
Camphor melts . . .	288	114	142	
Sulphur burns slowly .	303	120	150	
Pewter melts, [lead $\frac{4}{5}$, tin $\frac{3}{5}$,]	403	165	206	
Tin melts	442	182	227	
Type metal melts, [lead 16 parts, antimony 1,]	507	211	264	
Sulphuric acid (sp. gr. 1·848) boils	590	248	310	
Lead melts	612	258	325	
Mercury boils . . .	662	280	350	
Zinc melts	773	329	412	
Iron bright red in the dark—hydrogen gas burns?	800	341	427	
— red in twilight . .	884	386	475	
— red heat in daylight	1272	551	700	
Enamel colors *burnt*, or *burnt-in*,* on porcelain, ...	1392	605	756	6
Bronze melts, [copper $\frac{3}{4}$, tin $\frac{1}{4}$,]	1446	629	786	
———, [copper $\frac{7}{8}$, tin $\frac{1}{8}$,]	1534	668	835	
Diamond burns? . .	1552	676	845	14
"Orange heat" (Prinsep)	1650	719	899	
Brass melts, [copper $\frac{1}{2}$, zinc $\frac{1}{2}$,]	1672	730	911	
———, [copper $\frac{3}{4}$, zinc $\frac{1}{4}$,]	1690	737	921	21
Bronze melts, [copper $\frac{15}{16}$, tin $\frac{1}{16}$,]	1750	794	955	
Silver melts	1873	818	1023	28
Copper melts	1996	860	1091	
Gold melts	2016	862	1102	
Delft-ware fired . . .	2072	967	1179	40
Cast iron melts . . .	2786	1224	1420	
Cream-colored stoneware fired	2992	1316	1645	86
Temperature of the maximum of expansion of platinum, be-				

*This is a technical term used by enamellers, glass and porcelain painters, &c., to denote the fixing of the colors they employ, by means of vitrifaction, on the substances painted upon.

Fusing Points, &c on the scales of	Fahr.	Reau.	Cent.	Wedg.
ing nearly the highest degree of heat attainable in a laboratory wind-furnace, .	3280	1444	1805	
Flint glass furnace, greatest heat? . . .	3552	1253	1956	114
Soft iron melts, according to Clement and Desormes, but in all probability an estimate considerably above the truth, . .	3945	1406	2118	

Mr. Brayley observes, at the end of the table, "The still higher temperatures, derived from the experiments of Mr. Wedgwood, which were here given in former editions of the Chemical Catechism, are now omitted; a comparison of them with the results obtained by Mr. Daniell, by means of his pyrometer, having shown that they cannot be relied upon. Some of the temperatures given in this Table above that of ignition, or 800°, must also be regarded as doubtful, and all of them must be regarded as approximative merely.

Proceedings of the Royal Institution, London, Feb. 14, 1834—*Evening Meeting.* [From the London Repertory of Arts, &c.]

Dr. Faraday gave a conversation on Ericsson's Caloric Engine. He commenced by stating that he felt himself placed in a position of considerable difficulty, in bringing forward a subject on which such difference of opinion existed; yet the object of this institution was the philosophy of a question, not to decide on the probable result in a mercantile point of view, of any invention or engine which might be brought forward, and in explaining the principles of Captain Ericsson's invention, he trusted that he should not be held responsible for the correctness of the various propositions which he would have to make; at the same time, he was bound to state that, prior to the construction of the engine, one part of the invention was submitted to his opinion, and he had reported favorably; and this was the possibility of transferring the heat contained in a current of air passing in one direction to another current of air passing in an opposite direction (separated only by metallic surfaces); but how far this might be usefully and economically employed in obtaining an engine of power, it was not for him to determine; this question would be brought to a fair test when an engine of 50 horse power, now constructing, shall be set to work. Dr. Faraday then described the manner of transferring heat from one current of air to another by working models, and afterwards, by the aid of working diagrams, he explained the construction of Captain Ericsson's engine. Our having given a full account of this engine at page 42 of the present volume,* will render it unnecessary again to describe the principles on which this invention is proposed to work. Dr. Faraday having explained the various bearings of the question, concluded by observing that he was bound, in justice to his own character, to make a remark, which he regretted the more that it was possible and probable, had he been able to see Captain Ericsson prior to his entering into this explanation, he would have been able to remove a doubt and difficulty which he (Dr. Faraday) must confess he could not clear up to his satisfaction; this had been prevented by the serious illness of Capt. Ericsson. What he referred to was, that he could not clearly see how the difference of pressure, stated by the inventor to exist, could be maintained in the different parts of the apparatus.

Institution of Civil Engineers.—The following are the subjects which have been under discussion at the Tuesday evening meetings:

"What are the advantages to be derived from the application of undulating railroads?"

After a full discussion (lasting two evenings), in which many of our best and most talented men took part, this question was dismissed with a general expression, that there were no advantages to be derived, but, on the contrary, a decided loss.

"Heating power of coal and other kinds of fuel: Have any experiments been made, or data collected, from which can be calculated the number of cubic feet of atmospheric air which one pound of good Newcastle coal will raise 1° of Fahrenheit?"

This subject has called forward considerable information, but nothing final has been determined on; but so far as we are able to judge, Tredgold's calculations may be depended on for their correctness.

"Velocity of currents of air: Is there any instrument for measuring correctly the velocity of air in motion; and if so, upon what principle does its action depend?"

Mr. Barwise explained an instrument constructed by him for this purpose, and promised to construct one for the institution.

The following are the subjects which stand next for discussion:

"Grouting masonry and brickwork: The application of it—how and when it ought to be used—the materials for it."

"The worm in the timber of piles, &c.: Driven in salt water, and the means of preventing it."

"Lock gates and sluices: With any late improvements in the materials or construction."

"Steam: Any substitute for it—Ericsson's caloric engine."

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* For notices of this engine, see pages 65 and 181, vol. iii., of this Magazine.

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